

# RHIC CNI Anomaly study (continued)

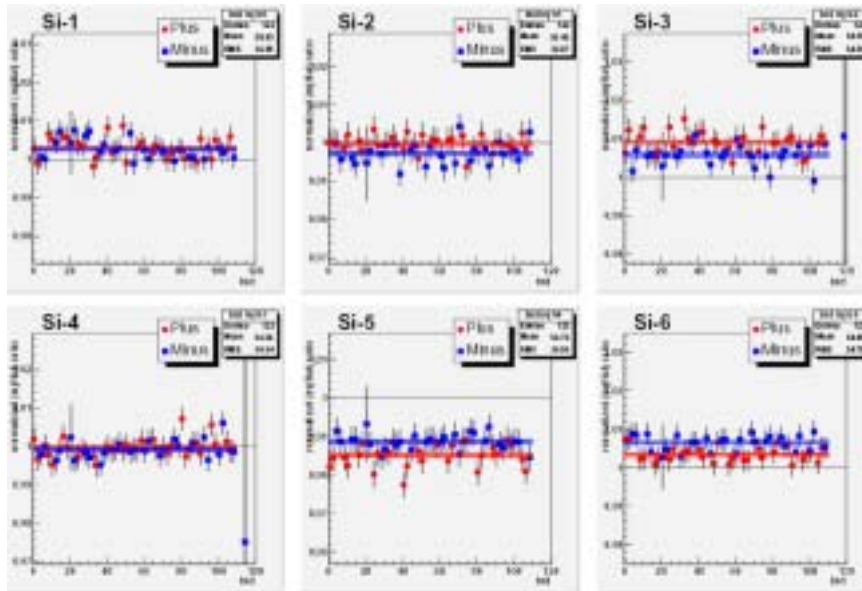
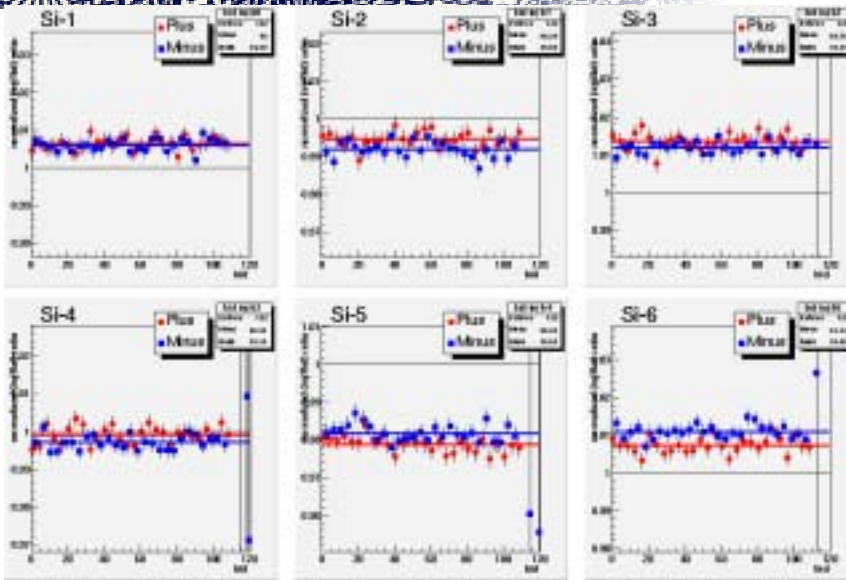
- Brief summary of anomalous behavior
  - For blue ring
    - $X_{90-x45} > 0$  at injection
    - $Y_{45} < 0$  at flattop
    - If Si-4 is not used,  $Y_{45}$  goes to zero (-t dist also)
  - For yellow ring
    - The effect is rather small, but can be seen in both energies
- The ideas to extract direct information for the items above
  1. Double ratio  $(\text{inj/flat})_{i\text{-th}}/(\text{inj/flat})_{\text{all}} \rightarrow$  difference in energy (done)
  2. Separate the asymmetry contributions from each detector (get some aspects, in progress)
  3. Choose half of detectors ( $\rightarrow$  plots)
  4. Change energy threshold ( $\rightarrow$  plots)

# Blue injection/flattop(1<sup>st</sup>)

Message

Si-4 (Si-1 also) shows opposite behavior

- Vertical 2
- Spin pattern +--+--
- 10/10 runs
- **Normalized by total Si**

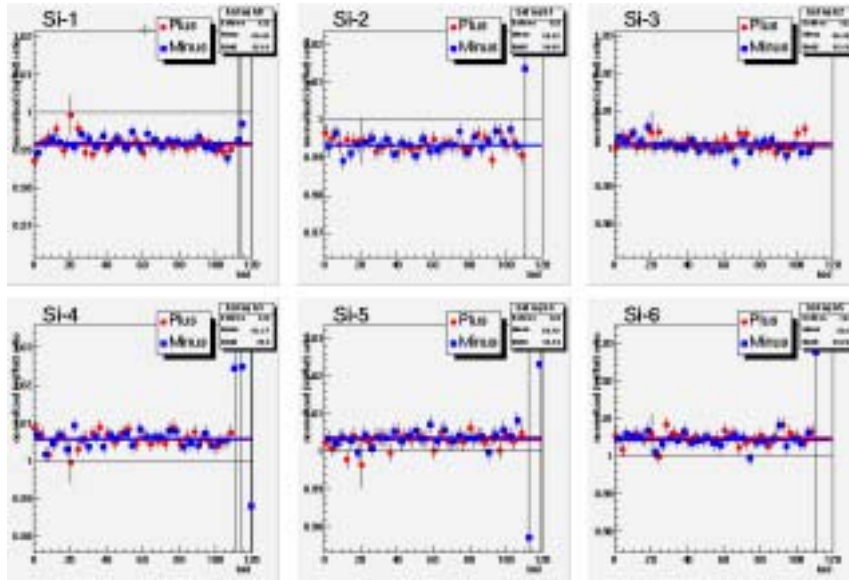


- Vertical 1
- Spin pattern ++++++-----
- 4/4 runs
- **Normalized by total Si**

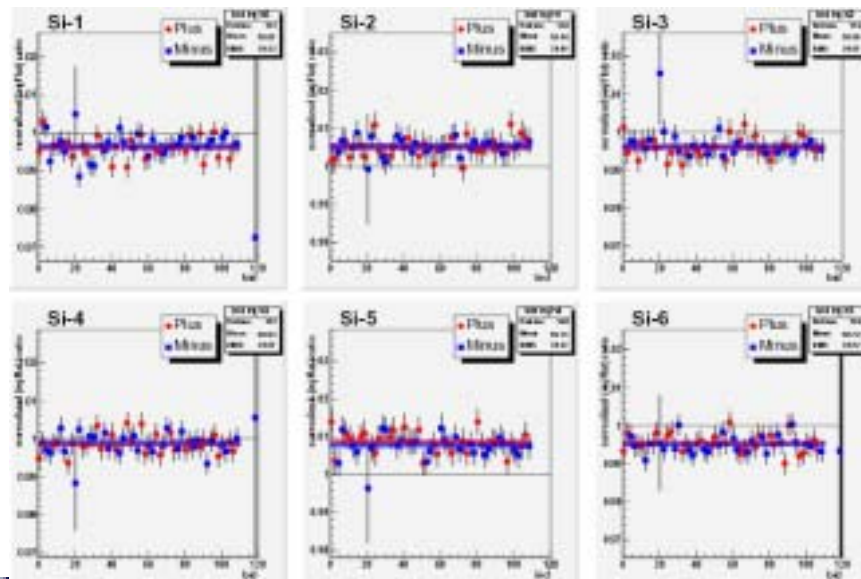
# Blue flattop(1<sup>st</sup>)/flattop(2<sup>nd</sup>)

Message

Every detectors show consistencies



- Vertical 2
- Spin pattern +-+--+
- 10/9 runs
- ***Normalized by Total Si***

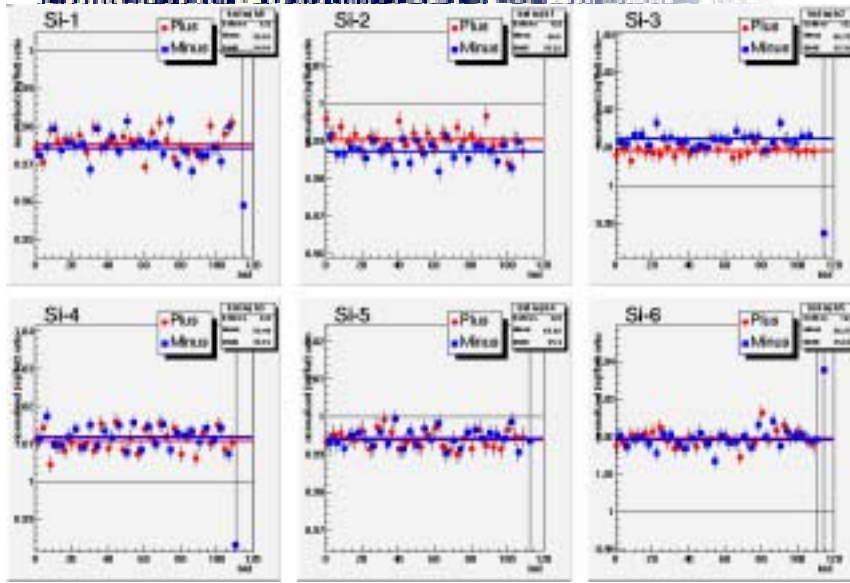


- Vertical 1
- Spin pattern +++-+---
- 4/4 runs
- ***Normalized by Total Si***

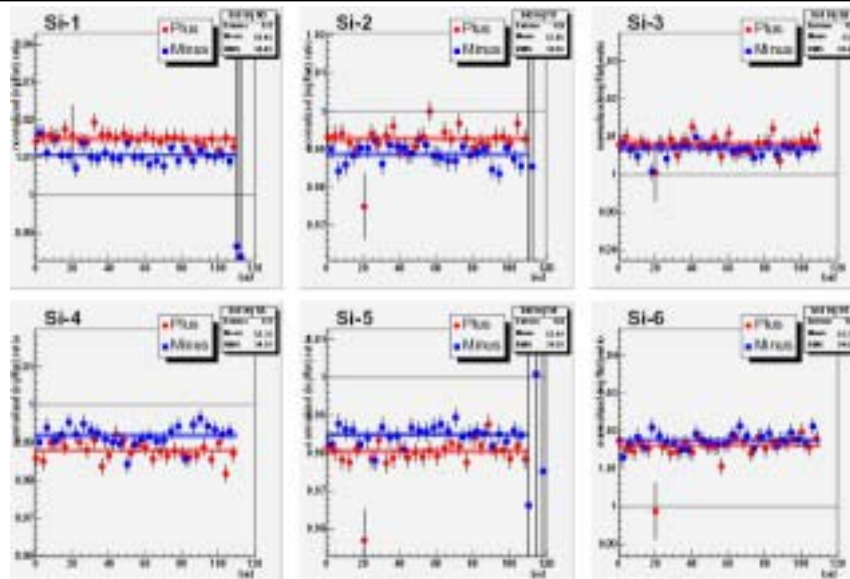
# Yellow injection/flattop(1<sup>st</sup>)

Message

Si-3 shows opposite behavior



- Vertical 1
- Spin pattern ++++---
- 11/11 runs
- ***Normalized by total Si***

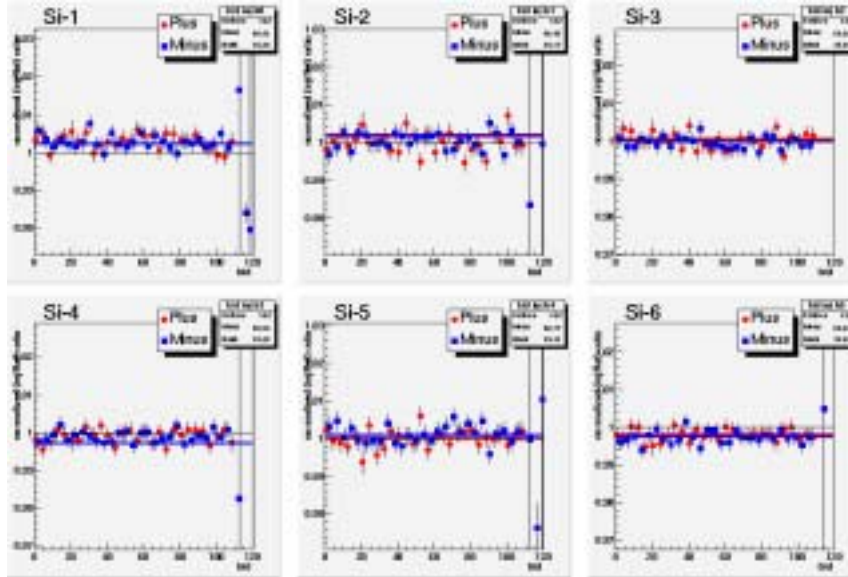


- Vertical 3
- Spin pattern ++++---
- 7/7 runs
- ***Normalized by total Si***

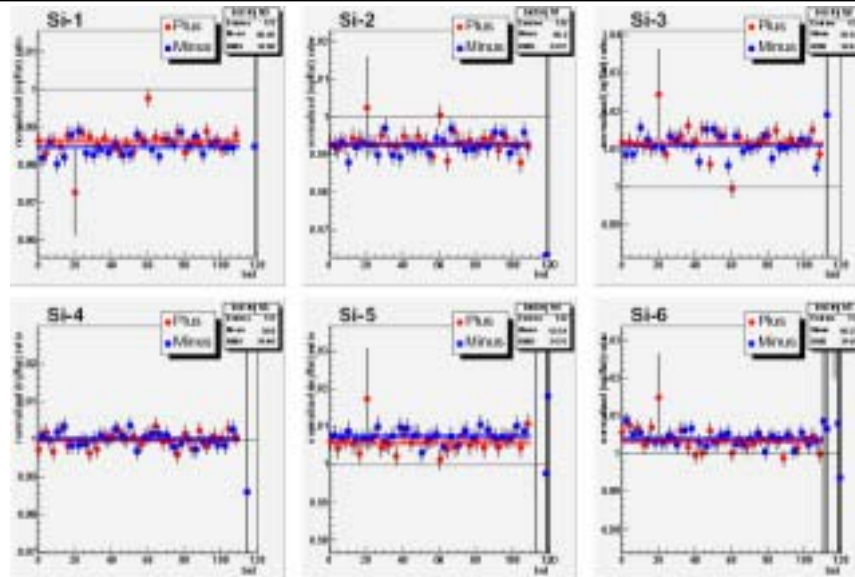
# Yellow flattop(1<sup>st</sup>)/flattop(2<sup>nd</sup>)

Message

Mean values are almost overlapping



- Vertical 1
- Spin pattern ++++--+--
- 10/19 runs
- ***Normalized by Total***

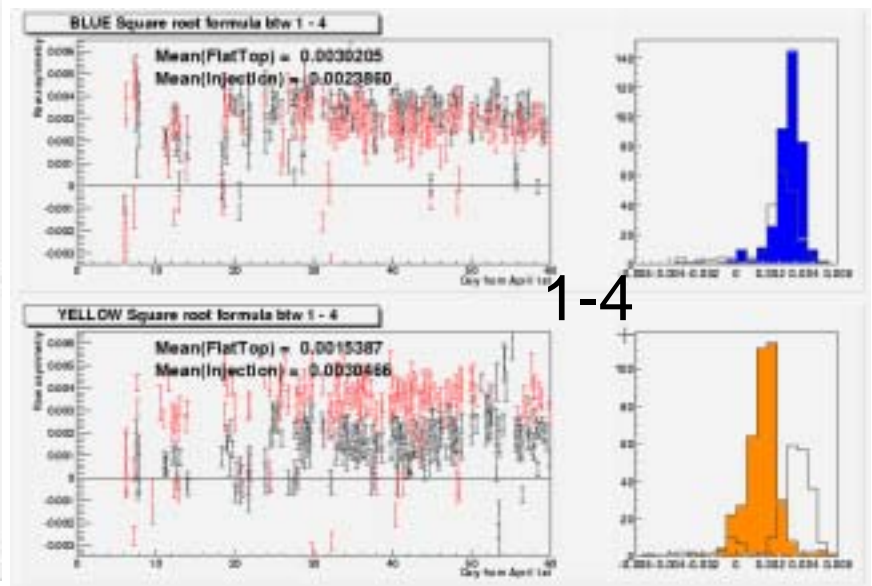
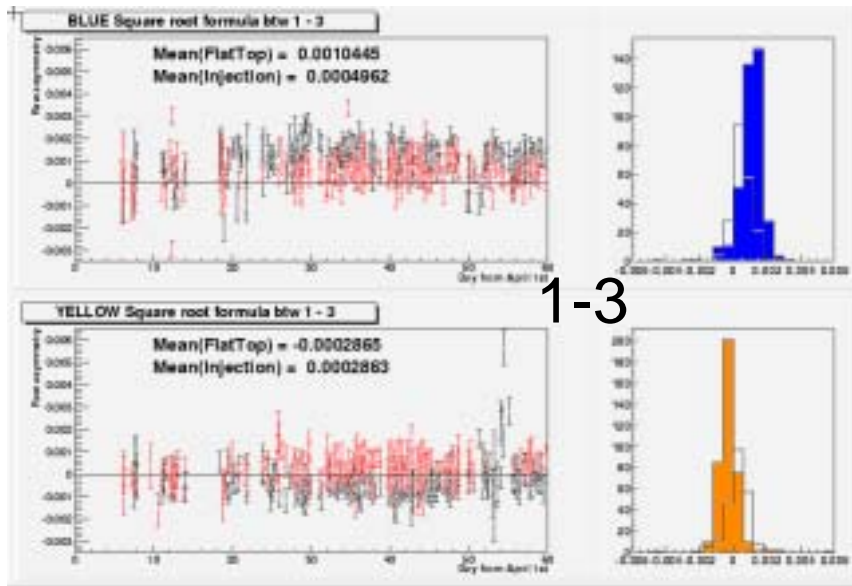
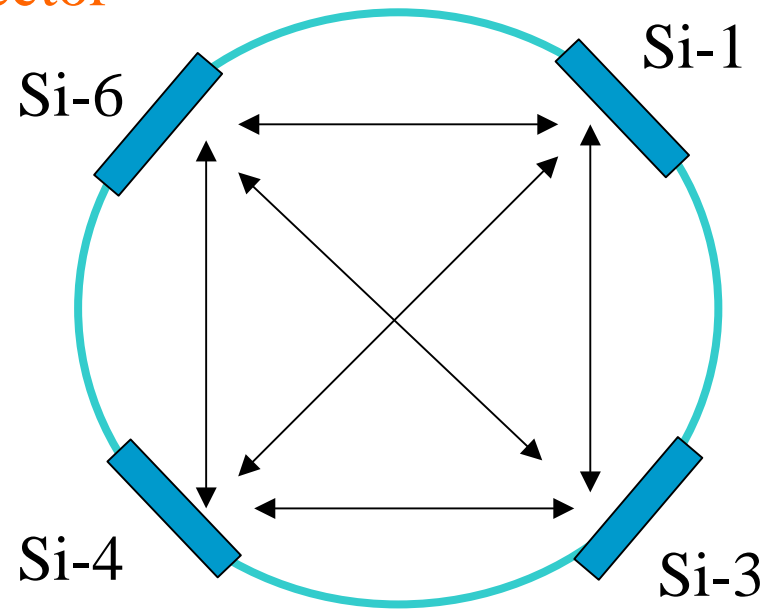


- Vertical 3
- Spin pattern ++++--+--
- 7/7 runs
- ***Normalized by Total***



# Square root formula for possible detector combinations

- Create the simultaneous equations with the average numbers, and solve them
- Ex)  $[1] - [3] = ??? \times 10^{-3}$   
 $[3] - [4] = ??? \dots$



# One set of answers for blue ring flattop

- This calculation is actually equivalent to the quantity

$$(U-RD)/(U+RD) \quad R=Lumi(U)/Lumi(D)$$

which can provide an absolute contribution (not relative) from each Si

1-3  $1.0 \times 10^{-3}$

1-4  $3.0 \times 10^{-3}$

1-6  $2.6 \times 10^{-3}$

3-4  $2.0 \times 10^{-3}$

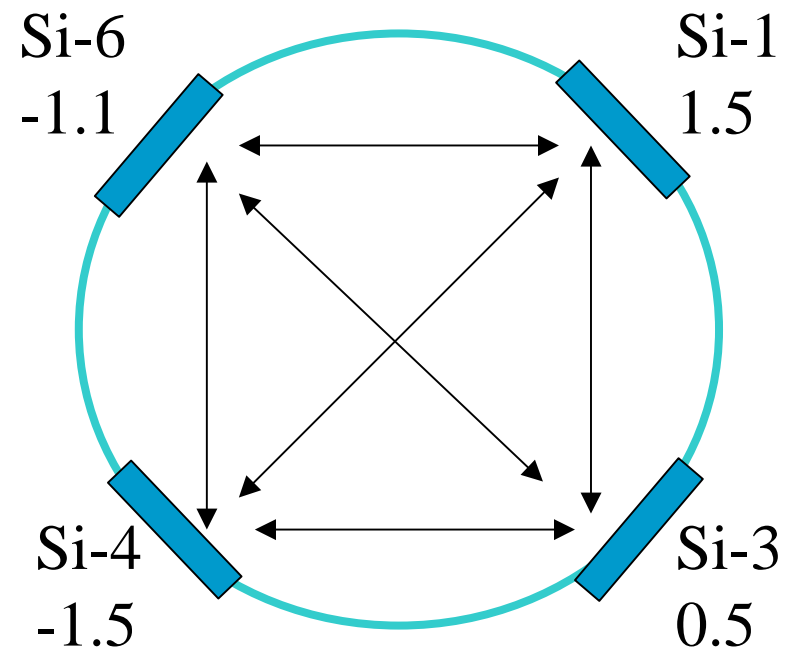
3-6  $1.5 \times 10^{-3}$

4-6  $-0.4 \times 10^{-3}$

With one more information

$$(1+6) - 3 = 0$$

The equations can be solved

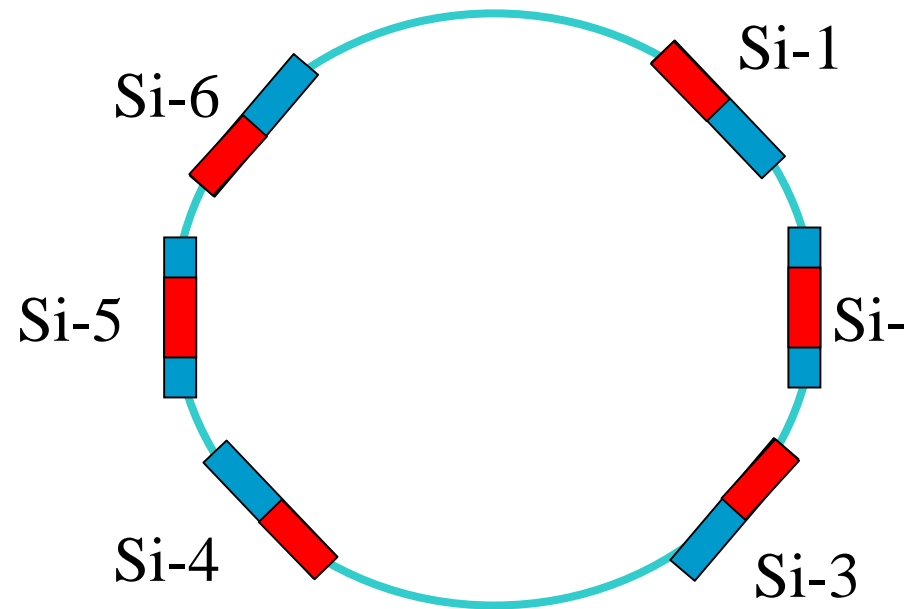


# Use fraction of strips for asymmetry calculation

Compare the results from

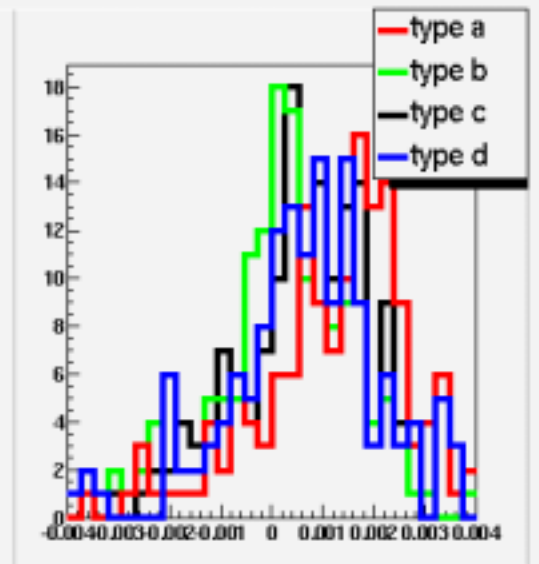
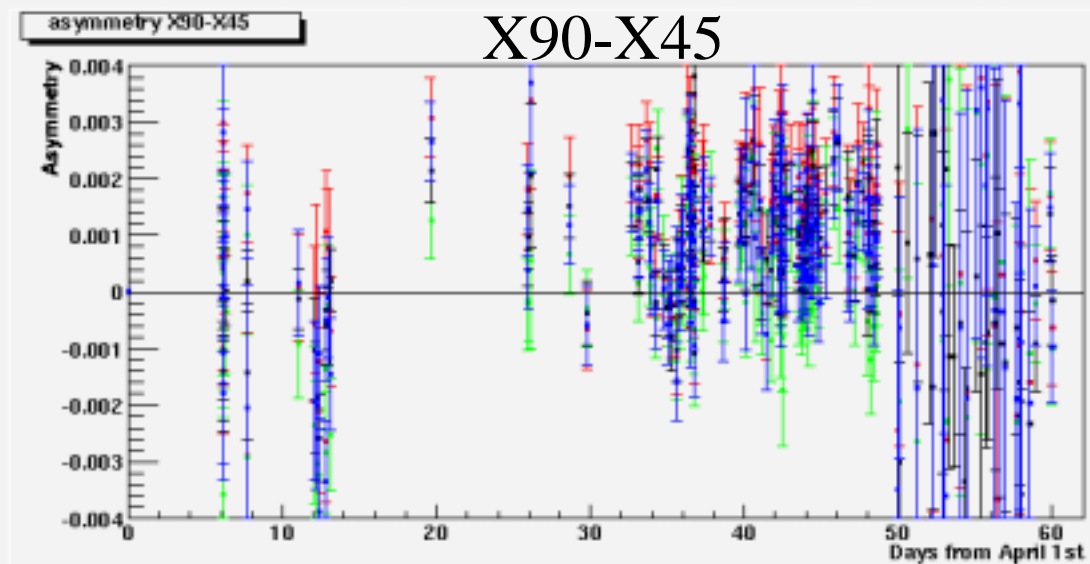
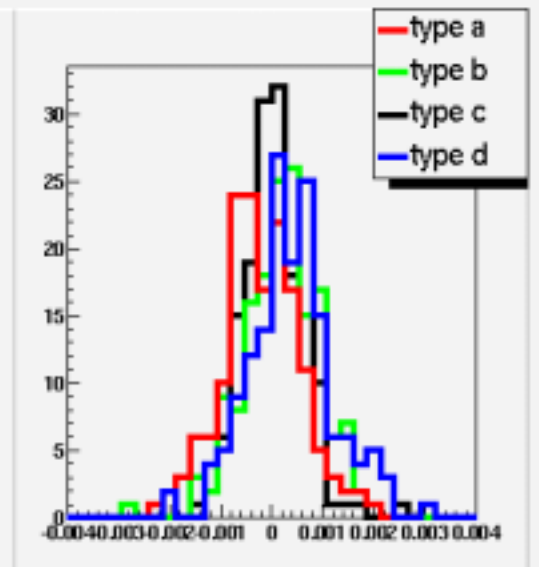
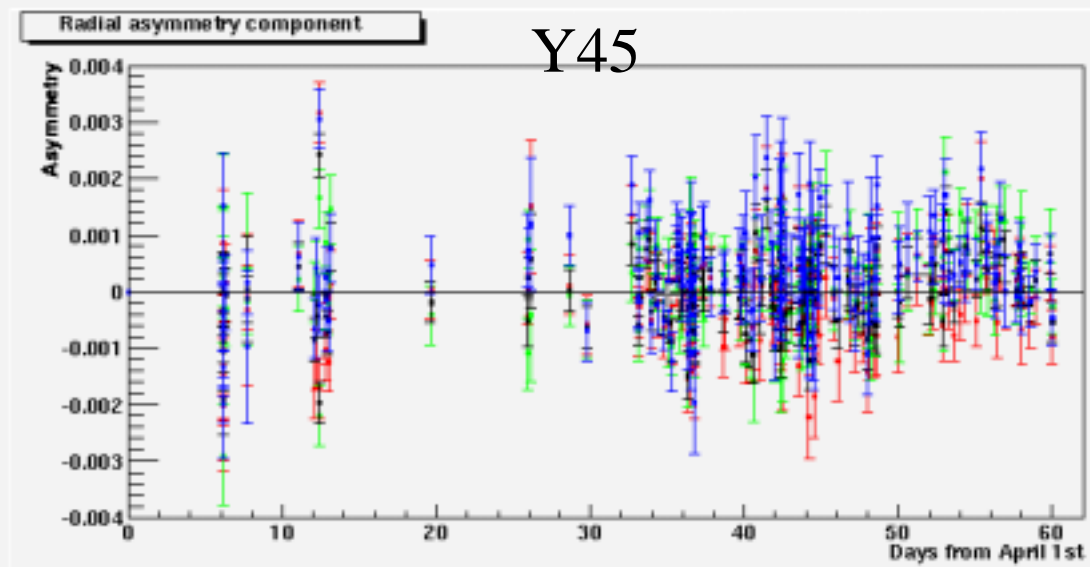
- first half strips
  - second half strips
  - total counts (original)
  - special choice
- For 90 degree Si, the Center 4 strips are chosen

The same calculation for higher  
Threshold 500keV (default  
400keV)



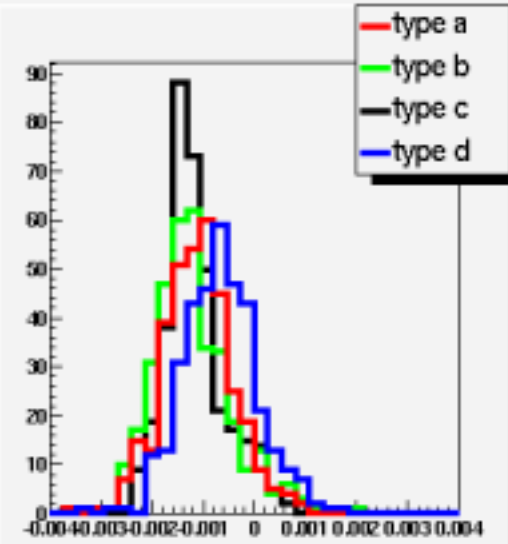
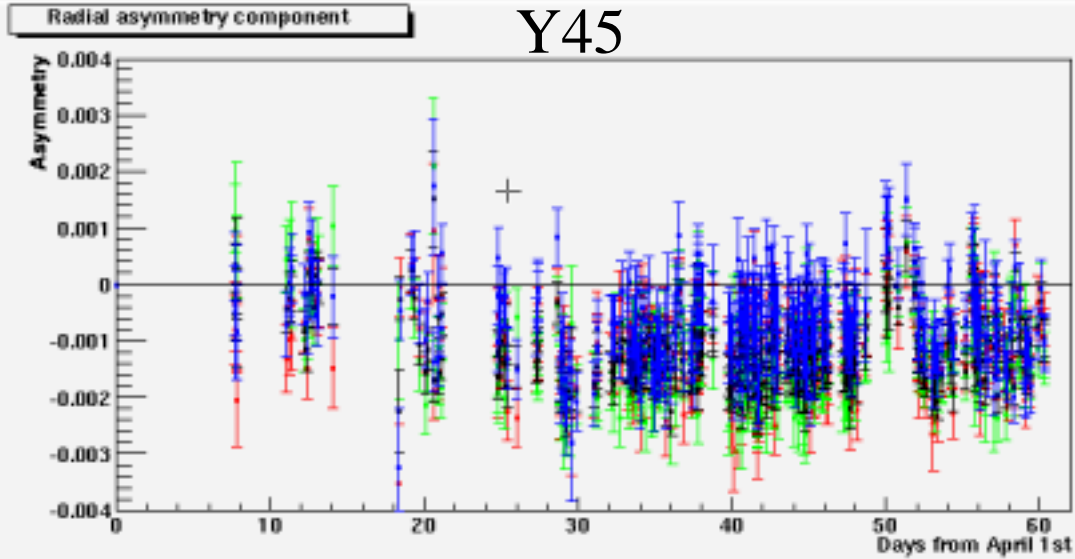


# BLUE injection (400keV)

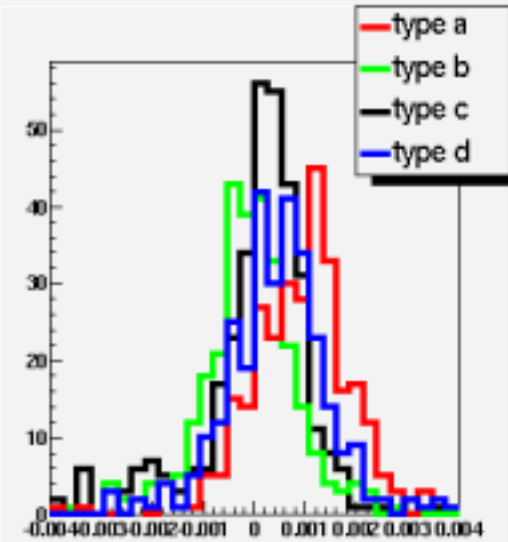
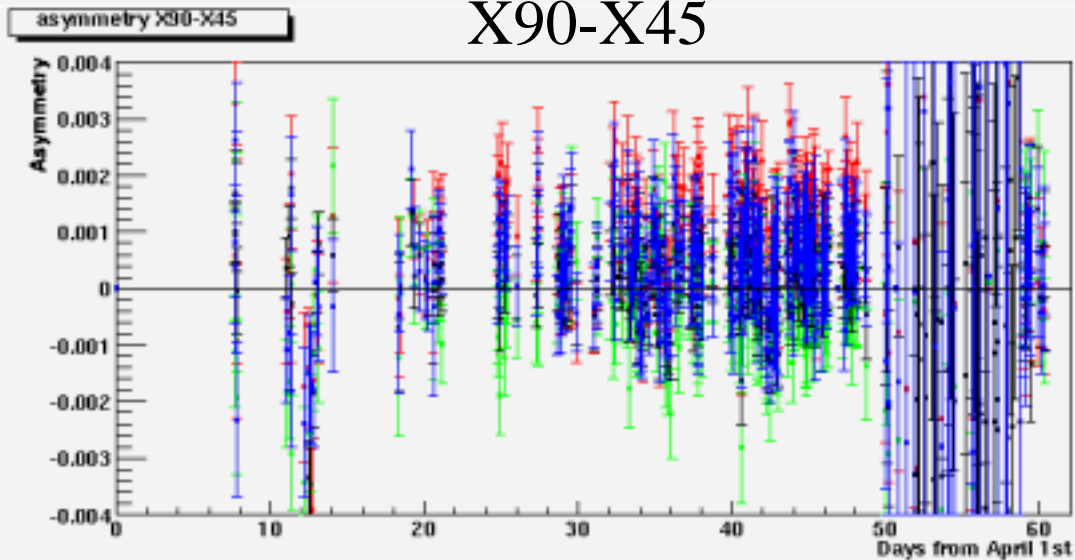


# BLUE flattop (400keV)

Y45

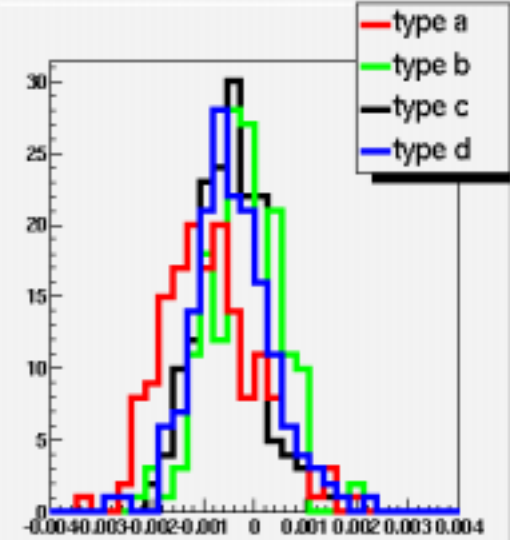
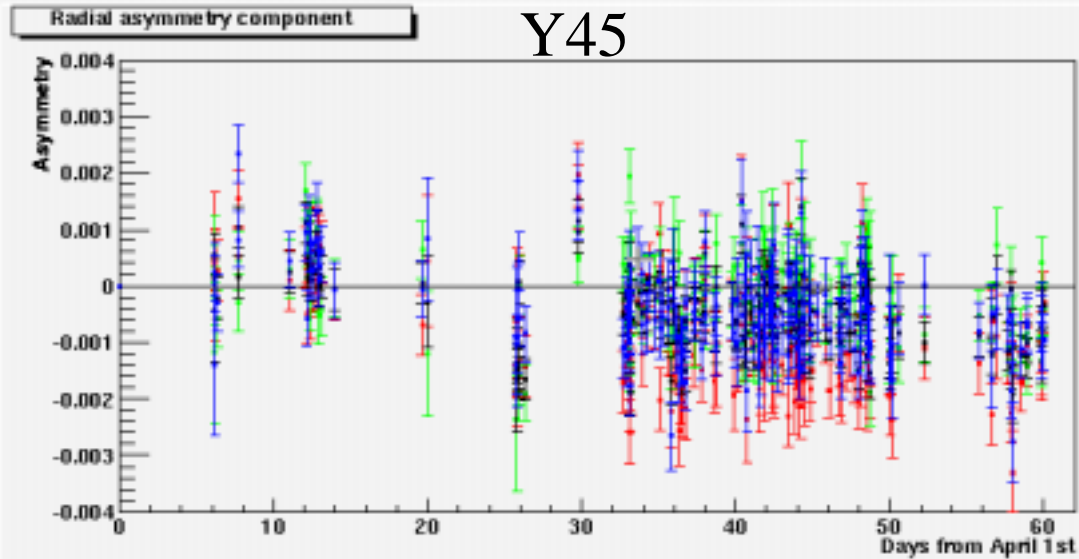


X90-X45

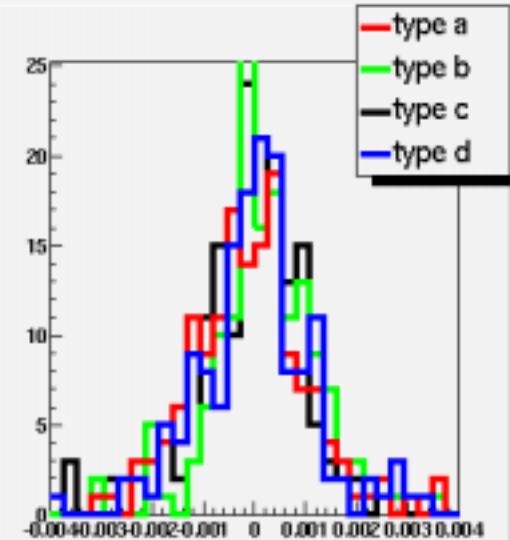
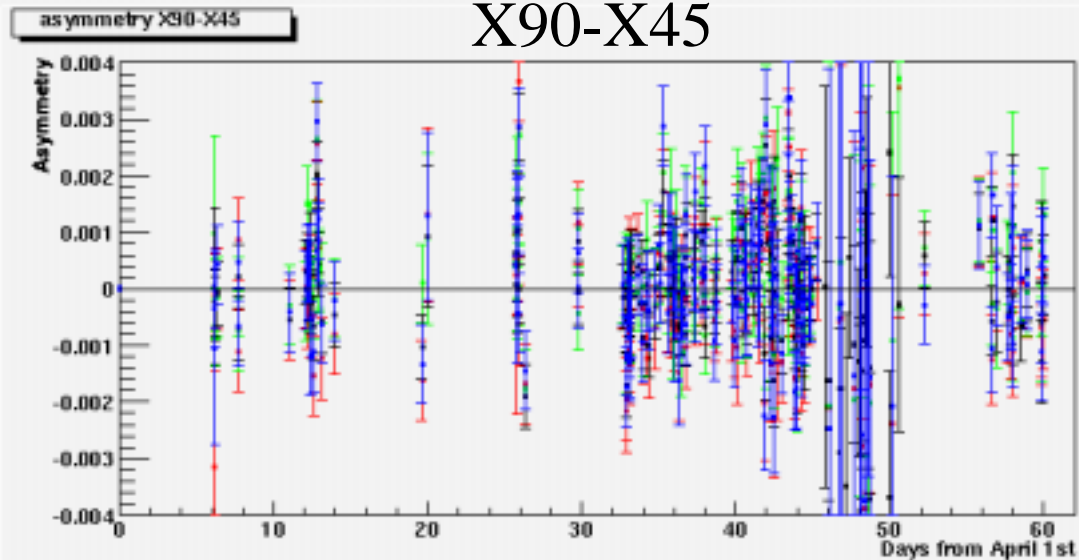


# Yellow injection (400keV)

Y45

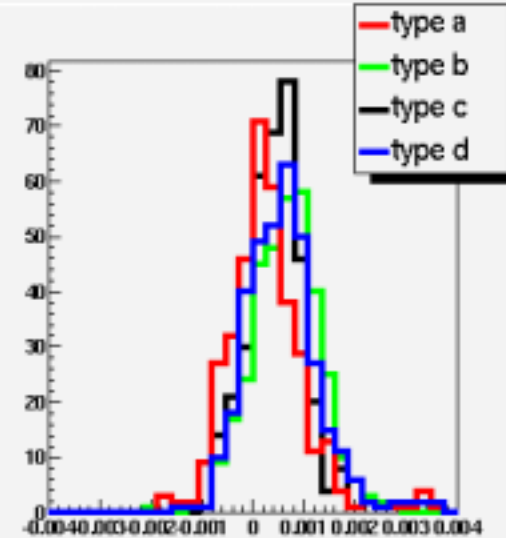
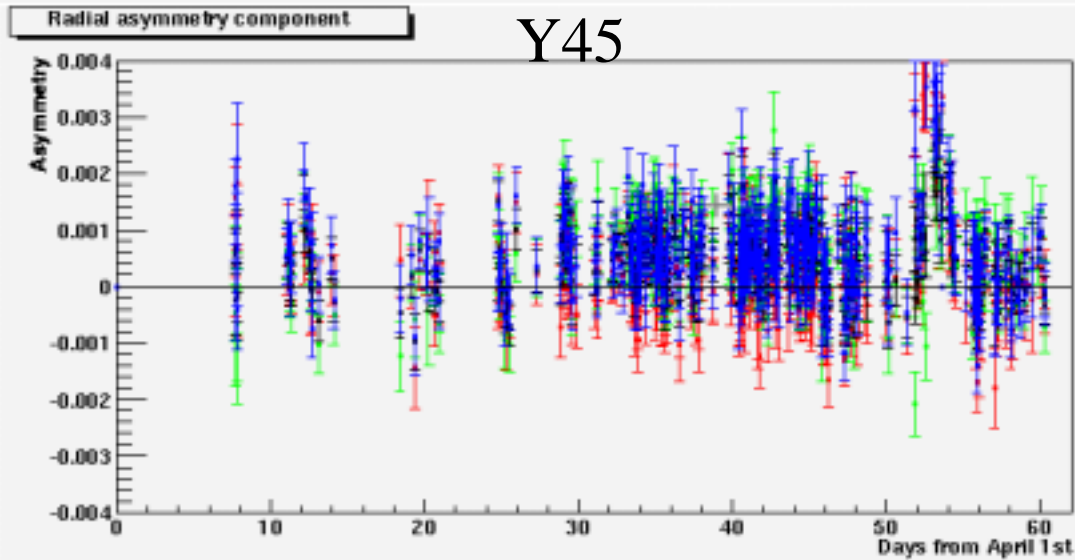


X90-X45

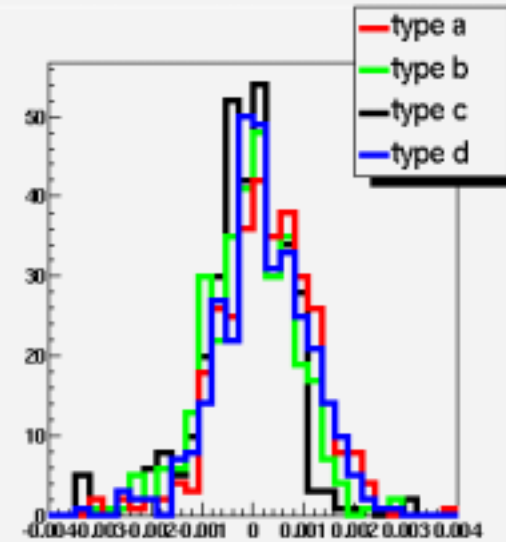
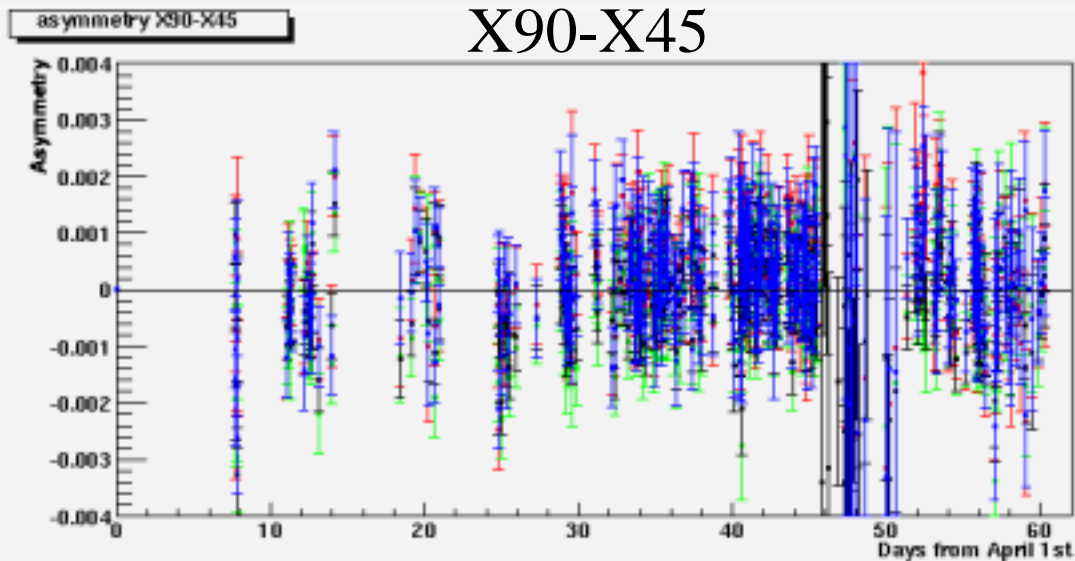


# Yellow flattop (400keV)

Y45



X90-X45

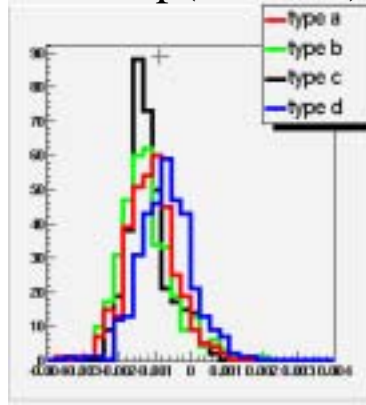
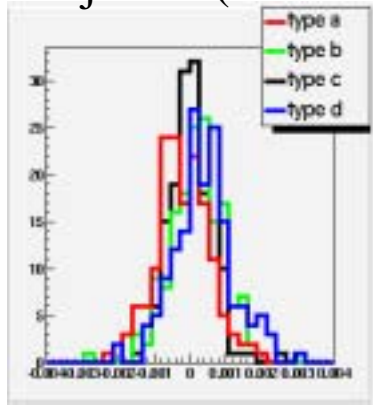


# Comparison 400.vs.500keV (BLUE)

Y45

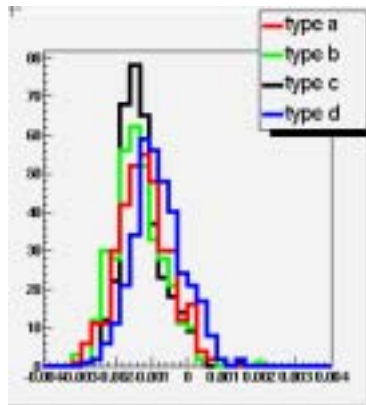
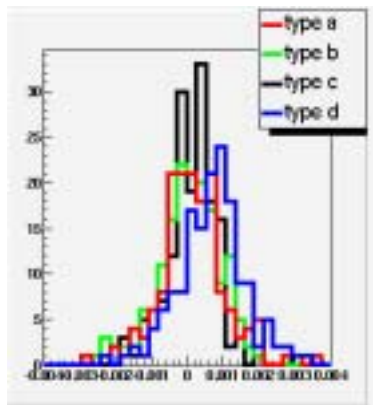
Injection(400keV)

Flattop(400keV)



Injection(500keV)

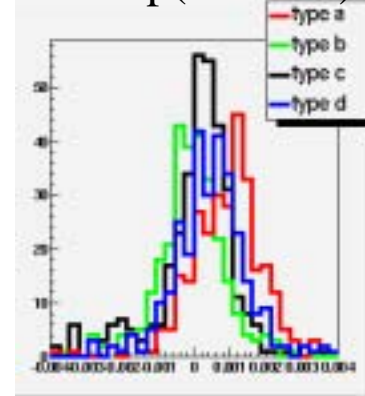
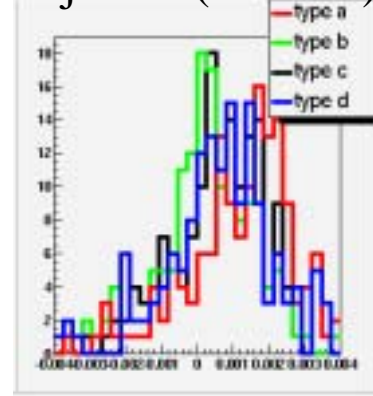
Flattop(500keV)



X90-X45

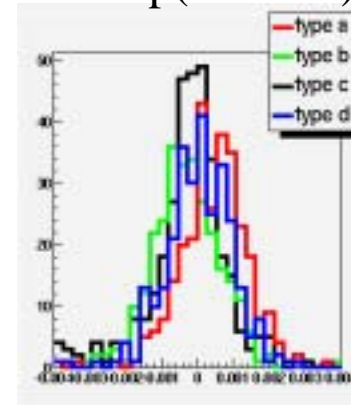
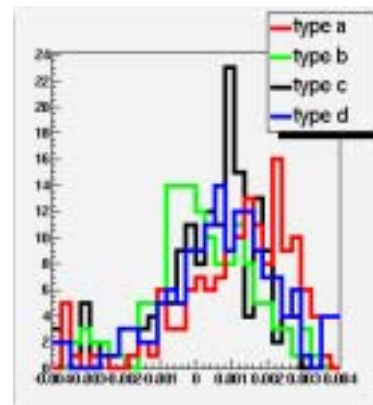
Injection(400keV)

Flattop(400keV)



Injection(500keV)

Flattop(500keV)



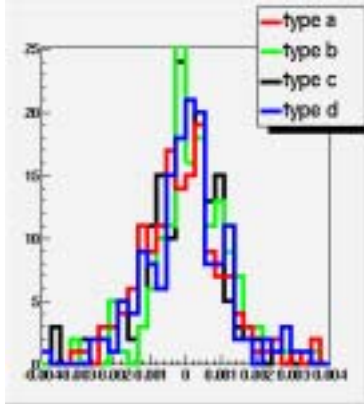
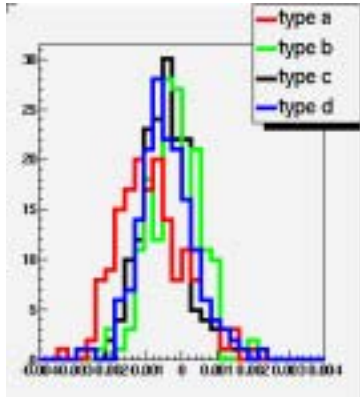


# Comparison 400.vs.500keV (YELLOW)

Y45

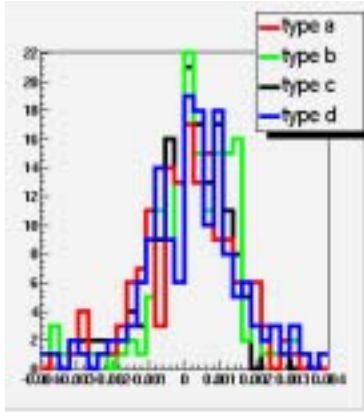
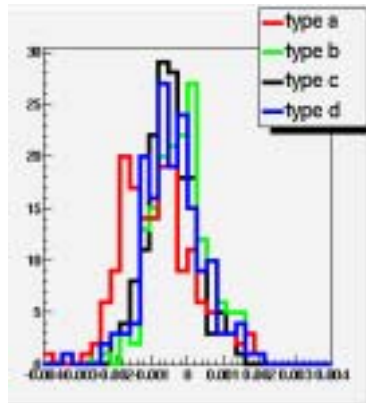
Injection(400keV)

Flattop(400keV)



Injection(500keV)

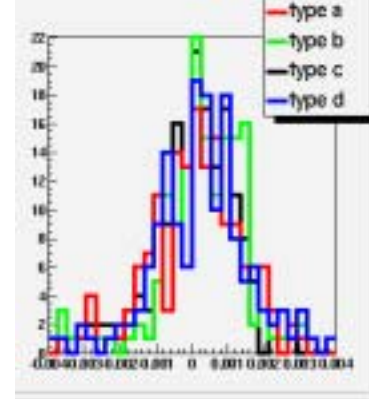
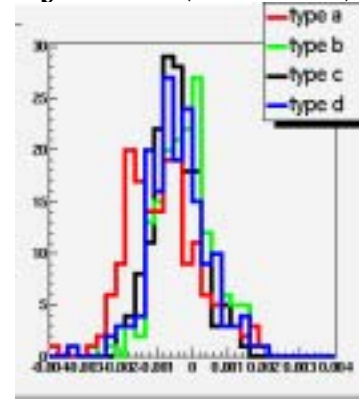
Flattop(500keV)



X90-X45

Injection(400keV)

Flattop(400keV)



Injection(500keV)

Flattop(500keV)

